

**Recovery Outline For  
Black Warrior Waterdog (*Necturus alabamensis*)  
January 2018**



Photo by Joseph Jenkins

## **I. INTRODUCTION**

This document outlines a preliminary course of action for the recovery of the Black Warrior waterdog until a comprehensive recovery plan for the species is approved. The Black Warrior waterdog is a large, aquatic, nocturnal salamander that permanently retains a larval form and external gills throughout its life. Found only in streams within the Black Warrior River Basin (Basin) in Alabama, the waterdog inhabits streams above the Fall Line, which is the contact zone between the Coastal Plain and the adjacent Piedmont physiographic province. Due to their highly permeable skin and external gills, Black Warrior waterdogs are very sensitive to declines in water quality. The Black Warrior waterdog was listed as endangered species on January 3, 2018 (83 FR 257). Water quality degradation is considered the primary reason for the extirpation of the Black Warrior waterdog over much of its historical range. Coupled with habitat fragmentation caused by creation of large impoundments, it is the predominant threat to the continued existence of the species. Changes in water chemistry and flow patterns, resulting in a decrease in water quality and quantity, have detrimental effects on salamander ecology because they can render aquatic habitat unsuitable. The Black Warrior waterdog is susceptible to increased vulnerability to catastrophic events because of small, isolated populations, low genetic diversity and reduced range.

### **Listing and Contact Information:**

Listing Classification:	Endangered range wide
Effective Listing Date:	February 2, 2018
Lead Agency, Region:	U.S. Fish & Wildlife Service, Southeast Region
Lead Field Office:	Alabama Ecological Services Field Office (ALFO)
Contact Biologist:	Matt Laschet, 251-441-5842, matthias_laschet@fws.gov

## **II. RECOVERY STATUS ASSESSMENT**

### **A. BIOLOGY/THREATS ASSESSMENT**

The Black Warrior Waterdog (*Necturus alabamensis*) is a large, aquatic, nocturnal salamander that ranges in size from 15.2 cm to 21.6 cm (6.25 – 8.75 in) in length (Conant and Collins 1998). Found only in streams within the Black Warrior River Basin (Basin) in Alabama, the waterdog inhabits streams above the Fall Line, which is the contact zone between the Coastal Plain and the adjacent Piedmont physiographic province. Microhabitat features for the Black Warrior waterdog are dominated by clay or bedrock with little sand, and also contain abundant rock crevices and rock slabs for retreats (shelter) and areas for egg laying. The Black Warrior waterdog also utilizes leaf pack for shelter from predators and as foraging areas for prey species. Black Warrior waterdogs are associated with stream depths of 1 to 4 meters (m) (3.3 to 13.1 feet (ft)), reduced sedimentation, and large leaf packs (leaves that fall into streams accumulate in packs usually behind branches, rocks, and other obstructions) supporting mayfly (Ephemeroptera spp.) and caddisfly (Trichoptera spp.) larvae. Of the known populations of the Black Warrior waterdog, only the Sipsey Fork and Brushy Creek populations, in Bankhead National Forest, appear to be maintaining numbers sufficient enough to be captured regularly. At other sites surveyed since 1990, only one or two waterdogs have been captured. In Sipsey Fork, 52 waterdogs were captured over a 3-year period, representing 173,160 trap hours, a rate of 1 waterdog per 3,330 trap hours (Durflinger-Moreno *et al.* 2006, pp. 70–71), indicating a species which is rare.

Due to their highly permeable skin (Duellman and Trueb 1986, p. 197) and external gills, Black Warrior waterdogs are very sensitive to declines in water quality. Water quality degradation is considered the primary reason for the extirpation of the Black Warrior waterdog over much of its historical range (Bailey 2000, pp. 19–20). Changes in water chemistry and flow patterns, resulting in a decrease in water quality and quantity, have detrimental effects on salamander ecology because they can render aquatic habitat unsuitable. Contributors to water quality degradation in the Black Warrior Basin include point source (end of pipe) discharges and runoff from urban, mining, agricultural and, historically, forestry land uses (Deutsch *et al.* 1990, pp. 1–62; Upper Black Warrior Technical Task Force 1991, p. 1; O’Neil and Sheppard 2001, p. 2). These sources contribute pollution to the Basin via sediments, fertilizers, herbicides, pesticides, animal wastes, septic tank and gray water leakage, and oils and greases.

Regulatory mechanisms have been inadequate to protect the species. The Federal Surface Mining Control and Reclamation Act of 1977 (SMCRA), as amended December 22, 1987, requires all permitted mining operations to minimize disturbances and adverse impacts to fish, wildlife, and related environmental values, as well as implement enhancement measures where practicable. It further recognizes the importance of land and water resources restoration as a high priority in reclamation planning. However, the continued decline of many species, including the flattened musk turtle, fishes, and a number of mussels in the Black Warrior Basin, is often attributed to mining activities (Dodd *et al.* 1988, pp. 55–61; Mettee *et al.* 1989, pp. 12–13; Hartfield 1990, pp. 1–8; Bailey and Guyer 1998, pp. 77–83; Service 2000, pp. 12–13), even though SMCRA is in effect.

The Alabama Department of Conservation and Natural Resources (ADCNR) recently added the Black Warrior waterdog to its list of non-game State-protected species (ADCNR 2012, pp. 1–4). Although this change will make it more difficult to obtain a collecting permit for the species, it does not offer any additional protection for habitat loss and degradation. The ADCNR also recognizes the Black Warrior waterdog as a Priority 2 species of high conservation concern in its

State Wildlife Action Plan due to its rarity and restricted distribution (ADCNR 2005, p. 298). However, this designation also does not offer any regulatory protections.

Alabama Department of Environmental Management (ADEM) has established minimum water-quality standards for some occupied stream segments within the Black Warrior River drainage under the authority of the Clean Water Act of 1972. These standards are believed to be protective of aquatic species. In Locust Fork, Mulberry Fork, and other tributaries of the Black Warrior River occupied by the Black Warrior waterdog, a combined total of 275 km (171 mi) have been identified on the Alabama 303(d) List (a list of water bodies failing to meet their designated water-use classifications) as impaired by siltation and nutrients (ADEM 2010, pp. 1–3). The sources of these impairments have been identified as runoff from agricultural fields, abandoned surface mines, and industrial or municipal sites. Multiple stream reaches within the occupied habitat of the Black Warrior waterdog (Locust Fork, Mulberry Fork, Yellow Creek, and North River) fail to meet current regulatory standards. Even with current regulations, surviving waterdog populations are negatively affected by discharges, highway construction, mining (current and unreclaimed sites), and other activities with a Federal nexus.

## **B. CONSERVATION ACTIONS**

In 1982 the Black Warrior waterdog was reviewed for listing as the Sipsey Fork waterdog. Since that time conservation actions have included surveys, habitat assessments (Bailey 1992, Bailey 2000, Durlinger-Moreno *et al.* 2006,), and environmental DNA (eDNA) surveys (Godwin 2016). The Black Warrior waterdog status was elevated, in 2015, to a candidate for listing. The ADCNR recognizes the Black Warrior waterdog as a Priority 2 species of high conservation concern in its State Wildlife Action Plan due to its rarity and restricted distribution (ADCNR 2005, p. 298). We have been working closely with our partners on the Black Warrior waterdog as a team since its elevation as a candidate to find out current occupied locations. For example, our State partner, Alabama Natural Heritage Program and the U.S. Forest Service recently completed a 2-year survey in the Black Warrior Basin system in an attempt to identify areas of occupation within the watershed. They utilized traditional surveys, in addition to evaluating water samples, within its historic range, for eDNA (Godwin 2016, de Souza *et al.* 2016); evidence indicated that the species was persisting in Sipsey Fork, Rush Creek, Yellow Creek, Locust Fork, and Brown Creek. In addition, the eDNA surveys detected the presence of Black Warrior waterdogs in Gurley Creek, which had no previous history of waterdogs being present. Also the forestry industry has begun to self-regulate Streamside Management Zones (SMZs) through a third-party certification program in which mills will not accept timber from foresters who do not comply with SMZ requirements, which helps improve water quality in the Basin. The Black Warrior waterdog consists of a series of disjunct populations due to habitat fragmentation caused by impoundments. Impoundments have been entrapments for waterdogs, isolating and inhibiting genetic exchange between populations in tributaries no longer connected by suitable flowing habitat.

## **III. PRELIMINARY RECOVERY STRATEGY**

### **A. RECOVERY PRIORITY NUMBER WITH RATIONALE**

The Black Warrior waterdog is assigned a recovery priority of 2, which indicates the species faces a high degree of threat with a low recovery potential. The degree of threat is considered high because low numbers, numerous threats and habitat fragmentation, many of the threats are throughout its range and impact both the species and its habitat. For example, water quality degradation, the most prevalent threat, is pervasive throughout its range and is exacerbated by habitat fragmentation. We consider this waterdog to have a low recovery potential because within the four units occupied by the Black Warrior waterdog, only the Sipsev Fork unit appears to support a reproducing population. All other units have shown a downward trend in population size.

## **B. RECOVERY STRATEGY/INITIAL ACTION PLAN**

The threats to the Black Warrior waterdog comes from multiples sources such as urbanization, silviculture/agriculture, mining, and habitat fragmentation caused by reservoirs. We do not anticipate these impacts to lessen, but to increase as the population and the needs of the State and the Country grow. Therefore the conservation and recovery of the Black Warrior waterdog will have to be a collaborative effort. One step in reaching the goal of recovering the Black Warrior waterdog is to improve the water quality in the critical habitat units by working with the stakeholders to designate these reaches as Outstanding Waters of Alabama. Through this process we would protect the waterdog and other listed aquatic species in the Basin.

A rough outline on how we will achieve these goals is:

- 1) Education and Outreach: to inform and educate the local municipalities, land owners, and various industries about the water quality issues and to also learn from their experiences and ideas on the issues. We can achieve this by listening to the advice of partners, landowners and stakeholders to find ways to reduce and alleviate threats to the Black Warrior waterdog. The North River (Tuscaloosa County) sediment traps is a good example of something that works to improve water quality, but appears that the neighboring Counties are not aware of the practice/method. We need to conduct outreach to our partners about these and other successful practices.
- 2) Research: continue monitoring the Black Warrior waterdog and the water quality in the Black Warrior Basin, focusing on known locations and critical habitat. Conduct surveys using conventional methods and eDNA to monitor known populations and to locate new populations. Water quality monitoring would be a cooperative effort with County, State (AL) and Federal agencies to protect habitat integrity and quality of river and creek segments that currently support or could support the species.
- 3) Implementation:
  - a) Based on the outreach and research, evaluate existing regulatory processes and work cooperatively to minimize and mitigate the loss and degradation of Black Warrior waterdog habitat resulting from surface coal mining activities, logging, agriculture, urbanization, oil and gas exploitation and easement maintenance.
  - b) Encourage development of state laws/regulations that are protective of the species. Utilize existing Clean Water Act regulatory mechanisms (Sections 401 and 404). Engage county officials or planners about voluntary conservation efforts for the species.
  - c) Encourage and support community based watershed stewardship planning and action.

Recovery actions for the Black Warrior waterdog will focus on surveying and monitoring existing populations (especially in areas of historical importance and more remote areas of the species' range including appropriate headwater reaches) and protecting habitat within the Black Warrior River Basin. Recovery actions (not in priority order) include:

1. Work with our partners to develop and implement programs geared towards educating the public and private industry on the need and benefits of ecosystem management. Ensure that our partners, landowners, private industry and the public are involved in the Black Warrior waterdog recovery efforts.
2. With stakeholders, evaluate and identify existing stressors and sources of threats throughout the species' range; evaluate or refine Best Management Practices and utilize existing agency programs to minimize, mitigate, and/or remove threats and prioritize areas in the Black Warrior River Basin for protection, enhancement, and restoration, including assessing water usage and land use changes. Create a rapid response/communication initiative to be prepared for potential truck spills, slurry pond breaches or other issues occur within the range of the species.
3. Conduct surveys using conventional methods and eDNA techniques for Black Warrior waterdog in the Black Warrior River Basin. Also continue research in an effort to determine life history requirements of the Black Warrior waterdog and apply the results toward management and protection of the species. Refine life history investigations to include aspects of spawning, larval and life stage ecology, and viability of populations. Continue to refine and implement technology for maintaining and propagating the Black Warrior waterdogs in captivity. Investigate the potential use of captive-reared or translocated Black Warrior waterdogs to augment a population or re-populate a previously occupied habitat area to increase viability of the general population. Investigate hydrogeomorphic changes in the Black Warrior River systems and how they impact the Black Warrior waterdogs.
4. Working with State and Federal Regulatory Agencies, Municipalities, non-governmental organizations, landowners, and private industry to implement techniques that improve water quality throughout the system. Work to ensure that water quality is meeting its designated use classification. In addition, target and eliminate/reduce known harmful water quantity and water quality problems which could impede recovery of Black Warrior waterdogs. And develop an integrated program demonstrating the importance of maintaining natural hydrology and adequate bankside vegetation in the Black Warrior River Basin based on the existing watershed management plans and forestry plans.

#### **IV. PREPLANNING PROCESS**

##### **A. PLANNING APPROACH**

A Black Warrior waterdog recovery team will be formed from stakeholders knowledgeable with the Black Warrior waterdog and the challenges facing its recovery. The recovery team will be made up of ADCNR biologists, Federal biologists, and Academics (Alabama Natural Heritage Program). The team should include personnel from ADEM, Alabama Surface Mining Commission (ASMC), and ADCNR, Academics and private citizens familiar with the issues in the Basin, with the Service guiding and ensuring the recovery needs and process are the focus. The team would also work in a complimentary effort with the Alabama stream network and the

Strategic Habitat Unit group in an effort to reduce redundant efforts and costs. A Species Status Assessment (SSA) will be completed prior to producing a recovery plan for the Black Warrior waterdog. Overall, an SSA uses the conservation biology principles of resiliency, redundancy, and representation (collectively known as the “3Rs”) as a lens to evaluate the current and future condition of the species. As a result, the SSA characterizes a species’ ability to sustain populations in the wild over time based on the best scientific understanding of current and future abundance and distribution within the species’ ecological settings. An SSA is in essence a biological risk assessment to aid decision makers who must use the best available scientific information to make policy decisions.

The recovery plan will include objective and measurable criteria which when met, will ensure the conservation of the species. Recovery criteria will address all meaningful threats to the species, as well as estimate the time and the cost to achieve recovery. The Alabama Ecological Services Field Office will lead the recovery planning effort. The draft plan should be finalized and sent to the Regional Office for review by February 1, 2019. The final recovery plan should be finalized and sent to the Regional Office for review by June 1, 2019. These timelines may change as affected by available resources and regional priorities.

**B. STAKEHOLDER INVOLVEMENT**

During the recovery planning process, input, comments and review will be sought from multiple stakeholders within Alabama. These will include State and Federal agencies, industrial and agricultural groups, research universities, and conservation organizations. Many stakeholders are currently cooperating in ongoing aquatic conservation planning and action groups within the Black Warrior River Basin.

Approve: 

Date: 4/10/18

 Assistant Regional Director, Region 4